

FLWEMS Paramedics Adult Protocol for the Management of:

CARDIAC DYSRTHYMIAS

(ACLS)

Indications

To outline the paramedic care and management of the adult patient with cardiac dysrhythmias.

Follow current American Heart Association © (AHA) Advanced Cardiac Life Support (ACLS) guidelines.

Special ConsiderationsPediatric ALS (PALS) protocols/algorithms are NOT outlined in this section.

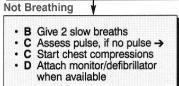
Comprehensive ECC Algorithm

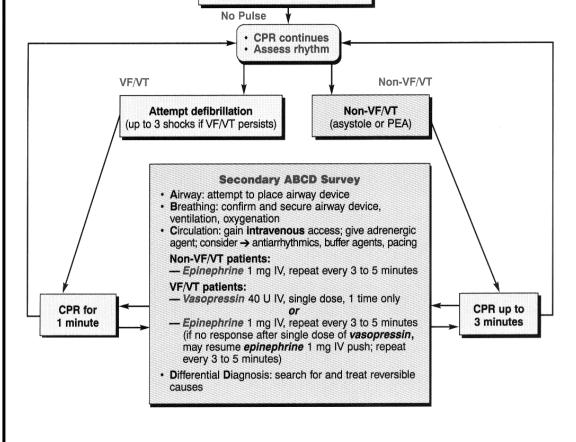


Person collapses
Possible cardiac arrest
Assess responsiveness

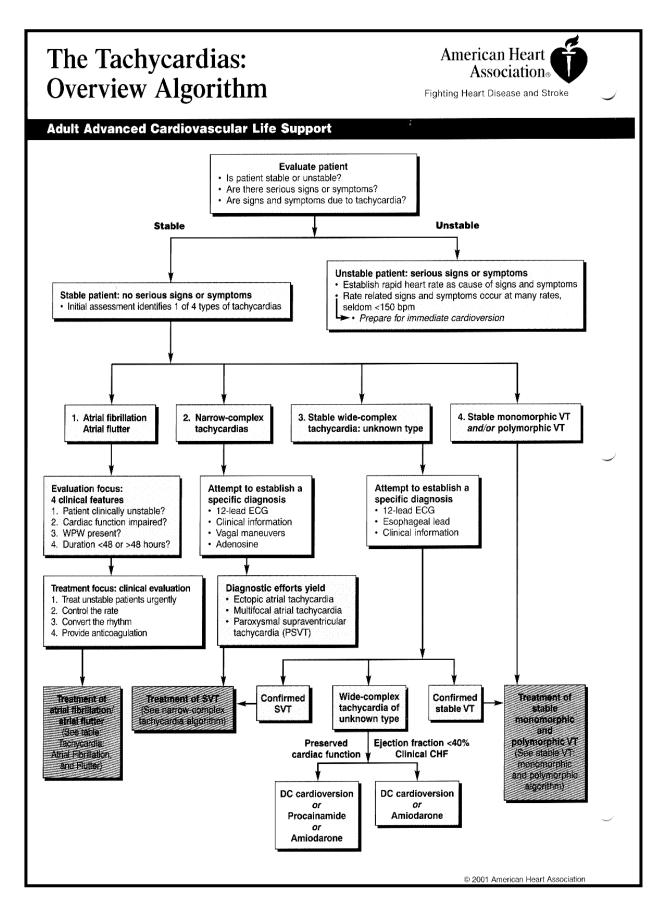
Unresponsive

Begin Primary ABCD Survey
(Begin BLS Algorithm)
Activate emergency response system
Call for defibrillator
Assess breathing (open airway, look, listen, and feel)





70-2507 (1 of 6) 5-01 © 2001 American Heart Association



Ventricular Fibrillation/ Pulseless Ventricular Tachycardia (VF/VT) Algorithm



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for and treat identified reversible

causes

Primary ABCD Survey Focus: basic CPR and defibrillation · Check responsiveness · Activate emergency response system · Call for defibrillator A Airway: open the airway B Breathing: provide positive-pressure ventilations C Circulation: give chest compressions Defibrillation: assess for and shock VF/pulseless VT, up to 3 times (200 J, 200 to 300 J, 360 J, or equivalent biphasic) if necessary Rhythm after first 3 shocks? Persistent or recurrent VF/VT Secondary ABCD Survey • Epinephrine 1 mg IV push, repeat every 3 to 5 minutes Focus: more advanced assessments Vasopressin 40 U IV, single dose, 1 time only and treatments A Airway: place airway device as soon as possible B Breathing: confirm airway device placement by exam plus confirma-Resume attempts to defibrillate tion device 1 x 360 J (or equivalent biphasic) within 30 to 60 seconds B Breathing: secure airway device; purpose-made tube holders preferred B Breathing: confirm effective Consider antiarrhythmics: oxygenation and ventilation • Amiodarone (IIb for persistent or recurrent VF/pulseless VT) Circulation: establish IV access Lidocaine (Indeterminate for persistent or recurrent VF/pulseless VT) Circulation: identify rhythm → · Magnesium (IIb if known hypomagnesemic state) • Procainamide (Indeterminate for persistent VF/pulseless VT; monitor Ilb for recurrent VF/pulseless VT) C Circulation: administer drugs appropriate for rhythm and condition Differential Diagnosis: search

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Resume attempts to defibrillate

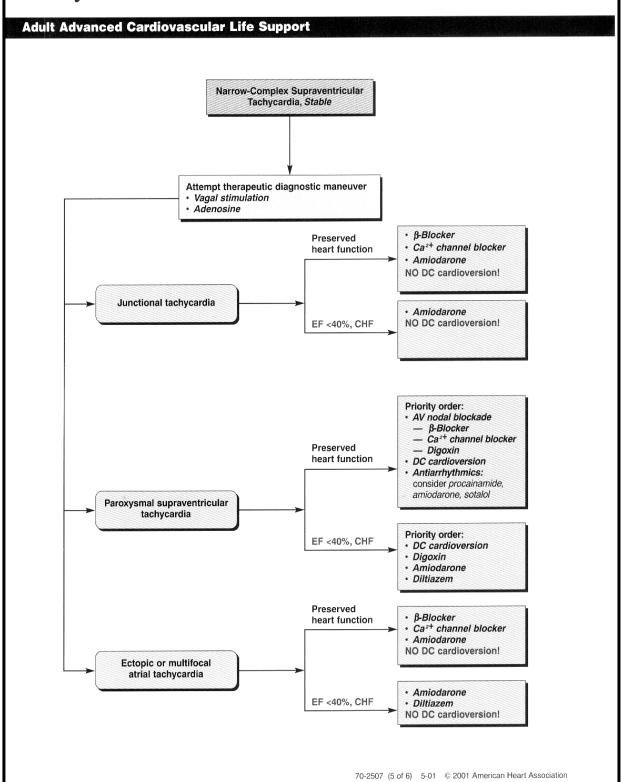
Stable Ventricular Tachycardia American Heart Association 8 Monomorphic and Polymorphic Fighting Heart Disease and Stroke **Adult Advanced Cardiovascular Life Support** Stable Ventricular Tachycardia Monomorphic or Polymorphic? Monomorphic VT Note! Polymorphic VT May go directly to · Is cardiac function impaired? · Is QT baseline interval prolonged? cardioversion Prolonged baseline Normal baseline QT interval Preserved QT interval (suggests torsades) Poor ejection fraction heart function Medications: any one Long baseline QT interval Normal baseline QT interval Procainamide · Sotalol · Treat ischemia · Correct abnormal electrolytes · Correct electrolytes Others acceptable Therapies: any one · Amiodarone Medications: any one Magnesium Lidocaine • β -Blockers or · Overdrive pacing · Lidocaine or · Isoproterenol · Phenytoin · Amiodarone or Lidocaine · Procainamide or · Sotalol Cardiac function impaired Amiodarone · 150 mg IV over 10 minutes Lidocaine 0.5 to 0.75 mg/kg IV push Then use · Synchronized cardioversion

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Narrow-Complex Tachycardia



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Tachycardia: Atrial Fibrillation and Flutter



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Control of Rate and Rhythm (continued from Tachycardia Overview)

Atrial fibrillation/ atrial flutter with • Normal heart • Impaired heart • WPW	1. Control Rate		2. Convert Rhythm	
	Heart Function Preserved	Impaired Heart EF <40% or CHF	Duration <48 Hours	Duration >48 Hours or Unknown
Normal cardiac function	Note 1: If AF >48 hours' duration, use agents with potential to convert rhythm with extreme caution in patients not receiving adequate anticoagulation because of possible embolic complications. Use only 1 of the following agents (see Note 2 below): • Calcium channel blockers (Class I) • β-Blockers (Class I) • For additional drugs that are Class Ilb recommendations, see Guidelines or ACLS text	(Does not apply)	Consider DC cardioversion Use only 1 of the following agents (see Note 2 below): Amiodarone (Class IIa) Ibutilide (Class IIa) Flecainide (Class IIa) Propatenone (Class IIa) Procainamide (Class IIa) Procainamide (Class IIa) For additional drugs that are Class IIb recommendations, see Guidelines or ACLS text	Avoid nonemergent cardioversion unless anticoagulation or clot precautions are taken (see Note 3 below) Note 3: Conversion of AF to NSR with drugs or shock may cause embolization of atrial thrombi unless patient has adequate anticoagulation. Use antiarrhythmic agents with extreme caution if AF > 48 hours' duration (see Note 3 above). or Delayed cardioversion Anticoagulation × 3 weeks at proper levels Cardioversion, then Anticoagulation × 4 weeks more or Early cardioversion Begin IV heparin at once TEE to exclude atrial clot then Cardioversion within 24 hours then Anticoagulation × 4 more weeks
Impaired heart (EF <40% or CHF)	(Does not apply)	Note 1: If AF >48 hours' duration, use agents with potential to convert rhythm with extreme caution in patients not receiving adequate anticoagulation because of possible embolic complications. Use only 1 of the following agents (see Note 2 below): • Digoxin (Class Ilb) • Amiodarone (Class Ilb)	Consider DC cardioversion or Amiodarone (Class IIb)	Avoid nonemergent cardioversion unless anticoagulation or clot precautions are taken (see <i>Note 3</i> above) Anticoagulation as described above, followed by DC cardioversion
WPW	Note 1: If AF >48 hours' duration, use agents with potential to convert rhythm with extreme caution in patients not receiving adequate anticoagulation because of possible embolic complications. • DC cardioversion or • Primary antiarrhythmic agents Use only 1 of the following agents (see Note 2 below): • Amiodarone (Class IIb) • Flecainide (Class IIb) • Propafenone (Class IIb) • Sotalol (Class IIb) Class III (can be harmful) • Adenosine • β-Blockers • Calcium blockers	Note 1: If AF >48 hours' duration, use agents with potential to convert rhythm with extreme caution in patients not receiving adequate anticoagulation because of possible embolic complications. DC cardioversion or Amiodarone (Class IIb)	DC cardioversion or Primary antiarrhythmic agents Use only 1 of the following agents (see Note 2 below): Amiodarone (Class IIb) Procainamide (Class IIb) Propafenone (Class IIb) Propafenone (Class IIb) Class III (can be harmful) Adenosine B-Blockers Calcium blockers Digoxin Impaired heart (EF 440% or CHF) DC cardioversion Amiodarone (Class IIb)	Avoid nonemergent cardioversion unless anticoagulation or clot precautions are taken (see <i>Note 3</i> above) Anticoagulation as described above, followed by DC cardioversion

NPW indicates Wolff-Parkinson-White syndrome; AF, atrial fibrillation; NSR, normal sinus rhythm; TEE, transesophageal echocardiogram; and EF, ejection fraction.

Note 2: Occasionally 2 of the named antiarrhythmic agents may be used, but use of these agents in combination may have proarrhythmic potential. The classes listed represent the Class of Recommendation rather than the Vaughn-Williams classification of antiarrhythmics.

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Electrical Cardioversion Algorithm



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Tachycardia With serious signs and symptoms related to the tachycardia If ventricular rate is >150 bpm, prepare for immediate cardioversion. May give brief trial of medications based on specific arrhythmias. Immediate cardioversion is generally not needed if heart rate is ≤150 bpm. Have available at bedside Oxygen saturation monitor Suction device IV line · Intubation equipment Premedicate whenever possible Synchronized cardioversion 100 J, 200 J, · Ventricular tachycardia 300 J. 360 J · Paroxysmal supraventricular monophasic energy

- tachycardia
- · Atrial fibrillation
- · Atrial flutter

dose (or clinically equivalent biphasic energy dose)

Notes:

- 1. Effective regimens have included a sedative (eg, diazepam, midazolam, barbiturates, etomidate, ketamine, methohexital) with or without an analgesic agent (eg, fentanyl, morphine, meperidine). Many experts recommend anesthesia if service is readily available.
- 2. Both monophasic and biphasic waveforms are acceptable if documented as clinically equivalent to reports of monophasic shock success.
- 3. Note possible need to resynchronize after each cardioversion.
- 4. If delays in synchronization occur and clinical condition is critical, go immediately to unsynchronized shocks.
- 5. Treat polymorphic ventricular tachycardia (irregular form and rate) like ventricular fibrillation: see ventricular fibrillation/pulseless ventricular tachycardia algorithm.
- 6. Paroxysmal supraventricular tachycardia and atrial flutter often respond to lower energy levels (start with 50 J).

Steps for **Synchronized Cardioversion**

- Consider sedation.
- 2. Turn on defibrillator (monophasic or biphasic).
- 3. Attach monitor leads to the patient ("white to right, red to ribs, what's left over to the left shoulder") and ensure proper display of the patient's rhythm.
- 4. Engage the synchronization mode by pressing the "sync" control button.
- 5. Look for markers on R waves indicating sync mode.
- 6. If necessary, adjust monitor gain until sync markers occur with each R wave.
- 7. Select appropriate energy level.
- 8. Position conductor pads on patient (or apply gel to paddles).
- 9. Position paddle on patient (sternum-apex).
- 10. Announce to team members: "Charging defibrillator—stand clear!"
- 11. Press "charge" button on apex paddle (right hand).
- 12. When the defibrillator is charged, begin the final clearing chant. State firmly in a forceful voice the following chant before each shock:
 - · "I am going to shock on three. One, I'm clear." (Check to make sure you are clear of contact with the patient, the stretcher, and the equipment.)
 - "Two, you are clear." (Make a visual check to ensure that no one continues to touch the patient or stretcher. In particular, do not forget about the person providing ventilations. That person's hands should not be touching the ventilatory adjuncts, including the tracheal tube!)
 - · "Three, everybody's clear." (Check yourself one more time before pressing the "shock" buttons.)
- 13. Apply 25 lb pressure on both paddles.
- 14. Press the "discharge" buttons simultaneously.
- 15. Check the monitor. If tachycardia persists, increase the joules according to the electrical cardioversion algorithm.
- 16. Reset the sync mode after each synchronized cardioversion because most defibrillators default back to unsynchronized mode. This default allows an immediate shock if the cardioversion produces VF.

70-2507 (4 of 6) 5-01 @ 2001 American Heart Association

Bradycardia Algorithm (Patient Not in Cardiac Arrest)



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Asystole: The Silent Heart Algorithm



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Fighting Heart Disease and Stroke **Adult Advanced Cardiovascular Life Support** Asystole **Primary ABCD Survey** Focus: basic CPR and defibrillation · Check responsiveness · Activate emergency response system · Call for defibrillator A Airway: open the airway Breathing: provide positive-pressure ventilations Circulation: give chest compressions Confirm true asystole D Defibrillation: assess for VF/pulseless VT; shock if indicated Rapid scene survey: is there any evidence that personnel should not attempt resuscitation (eg, DNAR order, signs of death)? **Secondary ABCD Survey** Focus: more advanced assessments and treatments A Airway: place airway device as soon as possible B Breathing: confirm airway device placement by exam plus confirmation device B Breathing: secure airway device; purpose-made tube holders preferred B Breathing: confirm effective oxygenation and ventilation Circulation: confirm true asystole Circulation: establish IV access Circulation: identify rhythm → monitor Circulation: give medications appropriate for rhythm and condition Differential Diagnosis: search for and treat identified reversible causes Transcutaneous pacing: If considered, perform immediately Epinephrine 1 mg IV push, repeat every 3 to 5 minutes Asystole persists Withhold or cease resuscitative efforts? Atropine 1 mg IV, · Consider quality of resuscitation? Atypical clinical features present? repeat every 3 to 5 minutes up to a total of 0.04 mg/kg Support for cease-efforts protocols in place?

Pulseless Electrical Activity Algorithm

Epinephrine 1 mg IV push,

repeat every 3 to 5 minutes



Adult Advanced Cardiovascular Life Support Pulseless Electrical Activity (PEA = rhythm on monitor, without detectable pulse) **Primary ABCD Survey** Focus: basic CPR and defibrillation · Check responsiveness · Activate emergency response system Call for defibrillator Airway: open the airway Breathing: provide positive-pressure ventilations Circulation: give chest compressions Defibrillation: assess for and shock VF/pulseless VT **Secondary ABCD Survey** Focus: more advanced assessments and treatments A Airway: place airway device as soon as possible B Breathing: confirm airway device placement by exam plus confirmation device B Breathing: secure airway device; purpose-made tube holders preferred B Breathing: confirm effective oxygenation and ventilation C Circulation: establish IV access Circulation: identify rhythm → monitor Circulation: administer drugs appropriate for rhythm and condition Circulation: assess for occult blood flow ("pseudo-EMD") Differential Diagnosis: search for and treat identified reversible causes Review for most frequent causes · "Tablets" (drug OD, accidents) Hypovolemia · Tamponade, cardiac Hypoxia · Hydrogen ion — acidosis · Tension pneumothorax Hyper-/hypokalemia · Thrombosis, coronary (ACS) · Thrombosis, pulmonary (embolism) Hypothermia

70-2507 (2 of 6) 5-01 © 2001 American Heart Association

Atropine 1 mg IV (if PEA rate is slow),

dose of 0.04 mg/kg

repeat every 3 to 5 minutes as needed, to a total